Summary Report of the Second Meeting of the World Trade Center Technical Review Panel

Tribeca Performing Arts Center
Borough of Manhattan Community College
New York, New York
April 12, 2004

Prepared for:

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NOTICE

This report was prepared by Eastern Research Group, Inc., an EPA contractor, as a general record of discussion held during the second meeting of the World Trade Center Technical Review Panel (April 12, 2004). This report captures the main points and highlights of the meeting. It is not a complete record of all details discussed, nor does it embellish, interpret, or enlarge upon matters that were incomplete or unclear. Statements represent the individual view of each meeting participant, and may or may not represent the analyses or positions of EPA.

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LIST OF ABBREVIATIONS

AALDEF	Asian American Legal Defense and Education Fund
AHERA	Asbestos Hazard Emergency Response Act
BMCC	Borough of Manhattan Community College
COPC	contaminants of potential concern
CUNY	City University of New York
HVAC	heating, ventilation, and air conditioning
MMVF	man-made vitreous fibers
NCEA	National Center for Environmental Assessment
NIOSH	National Institute for Occupational Safety and Health
NYCCELP	New York City Coalition to End Lead Poisoning
NYCDEP	New York Department of Environmental Protection
ORD	Office of Research and Development
PAH	polycyclic aromatic hydrocarbons
PBDE	polybrominated diphenyl ethers
PCM	phase contrast microscopy
PSC	Professional Staff Congress
SEC	Securities and Exchange Commission
TEM	transmission electron microscopy
USGS	United States Geological Survey
WTC	World Trade Center

EXECUTIVE SUMMARY

After the collapse of the World Trade Center (WTC) and the subsequent release of contaminants into the environment, the EPA Region 2 office conducted a voluntary cleanup of apartments and some buildings in a limited area surrounding Ground Zero. EPA is preparing for a sampling program whose purpose is to determine whether there has been any recontamination of the apartments cleaned in this program. EPA's Office of the Science Advisor convened an expert technical review panel whose members will help guide the Agency's development of this resampling program and, in the longer term, the Agency's use of the available exposure and health surveillance databases and registries to characterize any remaining exposures and risks, identify unmet public health needs, and recommend any steps to further minimize the risks associated with the WTC collapse. Members of the panel include representatives from the federal agencies directly involved in the air quality response and monitoring, the New York City Departments of Health and Environmental Protection, and outside experts.

The panel's second meeting occurred on April 12, 2004, at the Tribeca Performing Arts Center in New York City. This meeting was announced in the Federal Register and was open to the public.

The purpose of this second meeting was to:

- Revisit the Draft Resampling Protocol based on issues raised at the March 31, 2003, meeting.
- Review the appropriateness of using asbestos as a surrogate for other WTC contaminants.
- Receive public comment.

Paul Gilman (EPA's Science Advisor) and Paul Lioy (Professor of Environmental and Community Medicine at the Environmental and Occupational Health Sciences Institute of the Robert Wood Johnson Medical School–University of Medicine and Dentistry of New Jersey and Rutgers University) opened the meeting with introductory remarks and introduction of the panel. Then EPA presented the Draft Resampling Protocol and opened the floor for panel discussion. Public comments were received in the morning session.

In the afternoon session, EPA Region 2 presented the background for the use of asbestos as a surrogate for the other WTC contaminants. EPA's National Center for Environmental Assessment followed this presentation with a discussion of the peer review comments received on this issue. These presentations were followed by panel discussion. Gilman closed the panel discussion by reviewing the next steps for the panel, which was informed by the preceding panel discussion. After these presentations and discussions, EPA received public comments again. Gilman closed the meeting after receiving the public comments.

The key comments from each session of the meeting are presented by section below.

Key Points and Action Items from the Introduction and Opening Remarks to the Meeting

- Dr. Gilman explained that this second meeting of the Technical Panel addressed two specific elements of the panel charge:
  1) Review of proposed design to conduct post-cleaning verification sampling:
     - Determine whether heating, ventilation, and air conditioning (HVAC) systems have caused recontamination.
     - Review the WTC Residential Confirmation Cleaning Study.
     - Review input from last meeting.
     - Discuss the use of asbestos as a surrogate, including input from outside peer review panel.
  2) Consideration of a number of points:
     - Find areas in which the health registry can be enhanced.
     - Discuss issues related to geographic extent in revisiting questions related to the health registry and the Draft Resampling Protocol.
     - Discuss how to move forward.

Key Points and Action Items from the Discussion on Revisiting the Draft Sampling Protocol

- Terms should be clearly defined as they are used in these studies.
- The number of collected samples, whether these samples were combined to make one analytical sample, and the associated detection limits for these samples needs to be made clear.
- EPA should carefully consider low analytical results within each apartment, given the uncertainty surrounding these low values.
- It is extremely important to be clear about the questions that are asked and what can be answered with different types of sampling.
- Supplementary sampling to the original resampling plan should be considered.
- Sample data from settled surfaces is not necessarily relevant in the calculation of airborne health risks.

Key Points and Action Items from the Discussion on the Appropriateness of the Use of Asbestos as a Surrogate

- In presenting health risks, EPA should provide a median and an upper-bound cancer risk estimate to better indicate the actual risk of asbestos-related cancer.
- Some residents reported visible dust in their apartments after cleaning or testing. The public might feel more comfortable with the test results from their apartments if there were no visible dust.
- It is questionable to conclude that asbestos sampling was most conservative when 75 percent of the measurements were unmeasureable (overloaded) samples.
- The testing protocol during the original sampling was inconsistent and did not follow protocol in many instances.

- The absence of visible dust does not necessarily indicate the absence of WTC contaminants.
- The human health risk calculated from the results from air sampling versus wipe sampling should not be interchanged.
- The contaminant in the original exposure that is causing the acute symptoms needs to be identified.
- The sampling protocol could be amended to include wipe samples for lead, polycyclic aromatic hydrocarbons, and possibly other WTC contaminants.
- The resampling plan should consider issues beyond recontamination of the apartments originally part of the Residential Assistance Program.
- Children in the area under 12 years of age should be blood tested.
- The resampling program should include a general screen of Lower Manhattan instead of following the original sampling protocol, which includes only those spaces that were previously sampled.
- The possibility of identifying a WTC contamination fingerprint, using the glass fibers from slag wool as some indicator, should be further investigated.
- The members of the panel should not consider resources in evaluating an appropriate sampling program.
- The community should be involved in the decision-making process for resampling.
- HVAC should be tested as much as possible in the resampling.
- Resampling should contain a full sample of the types of areas that are of interest, including HVAC, cleaned areas, uncleaned areas, offices, and residences.
- Focus groups should be formed within the community to ensure that the sampling program will address their questions as well as EPA's requirements.

Key Points and Action Items from the EPA's Summary and Next Steps

- Some members of the panel suggested that the resampling program not be limited to the goal of addressing recontamination in only the locations sampled/monitored previously.
- Some members of the panel suggested conducting a screening effort before a complete sampling program is designed; the effort should include public buildings, fire stations, and commercial areas as well as residences.
- The program should look at a select number of buildings to investigate the question of whether HVAC systems might be the source of recontamination.
- Focus groups should be formed representing the community.
- Focus groups should be formed to determine the issues that the community would like addressed by the program, as well as the community reaction to the questions that would be answered by such a study.
- Members of the panel believe it is worthwhile to try to identify a fingerprint of WTC dust, if possible.
- Members of the panel believe that the sampling program should be expanded to include analytes other than asbestos, with the following considerations:
  - Continue to address the contaminants of potential concern.

  - Consider particulates and fibers.
  - Try and develop a signature for the dust that might be informative for that screening effort.
- The members of the panel should become more informed on the breadth of the health effects work being performed by the National Institute of Environmental Health Sciences and the Agency for Toxic Substances and Disease Registry on WTC issues.
- The members of the panel should become more informed about the other acute effects health data that exist, including the firefighter health data.
- Gilman suggested the members of the panel could provide input to the Homeland Security Research Center researchers creating the building safety research effort.
- EPA will think through the results of Dr. Gilman's summary and subsequent panelist comments and develop a straw man to distribute to the members of the panel and the community for discussion at the May 12 conference call.
- Members of the panel should provide individual recommendations on how they think EPA should move forward on developing the screening study, including comments on the strengths and weaknesses of this effort.

Key Points and Action Items from the Public Comments

- Asbestos is not an adequate surrogate for other WTC contaminants.
- The technical panel processes should remain transparent and allow for public involvement.
- The formation of the asbestos peer review should have involved public participation.
- Leaders and institutions should make a commitment to make resources available to address the wide scope of harm and shortage of resources and studies available to help people of color in Chinatown and the Lower East Side area.
- The protocols in the first sampling and monitoring study were not consistently or properly followed, and therefore these data cannot accurately be used in comparison with new data.
- EPA's documents should be peer-reviewed.
- An independent scientific entity (like the National Academy of Sciences) should oversee an aggressive testing, analysis, and cleanup program for all Lower Manhattan residents, regardless of whether or not they were previously tested.
- Christine Todd Whitman should be present at these meetings and explain the relationship of her statements about the WTC area to the White House Administration's decisions.
- There needs to be an outreach effort to inform the newer residents of Lower Manhattan of the contamination and risks.
- The sampling effort should consider contaminants resulting from the fires, including other organics and fine particulates.
- The sampling effort should consider synergistic effects of contaminants that may have occurred during the disaster.

- The sampling program should consider that outdoor settled dust does not contain the same proportion of fine particulate that is suspended in air and seeps inside buildings.
- The sampling program should consider that many soft surfaces in apartments can be reservoirs for contaminants, including for volatiles, mercury, and dioxins.
- The sampling program's design should consider polybrominated diphenyl ethers. This class of compounds is distributed differently than other particulate and is expected to have settled in higher floors of buildings.
- The question should be answered: Is the purpose of the testing and cleaning experiment to determine success in the limited area that was part of the prior program, or is the purpose to identify the extent of any hazardous conditions that still exist across Manhattan, Brooklyn, and elsewhere so that a complete remediation can be conducted?
- A list should be obtained from the Red Cross of people they treated at Ground Zero who may not know they need treatment now.
- Members of the panel should rethink health-based standards that may have been set 20 years ago.
- This panel should meet and keep meeting as long as necessary to ensure that the dots can be connected 20 years from now, when some of the long-term effects are being experienced.
- Children and pregnant women in the area affected by the WTC need to be screened for lead exposure. If lead is found, EPA should test for lead in the apartments as well.
- The sampling program should:
  - Test workplace interiors and residences.
  - Study synergistic effects.
  - Enlist professional cleaning crews.
  - Conduct ongoing monitoring for indoor air quality and outside air and water quality.

1. INTRODUCTION

The collapse of the World Trade Center (WTC) resulted in the incursion of contaminants to the indoor environment, including residences, business offices, stores, and other commercial areas near Ground Zero. During 2002 and 2003, the EPA Region 2 office conducted a volunteer cleanup of apartments and some buildings in Lower Manhattan in the area south of Canal Street. EPA is preparing to begin a second program of apartment sampling. One purpose of this sampling effort was to determine whether there has been any recontamination of the apartments cleaned in the earlier cleanup program.

EPA's Office of the Science Advisor convened an expert technical review panel whose members will help guide the Agency's development of this resampling program and its endeavors to address public health and exposure issues related to the WTC. Members of the panel include representatives from the federal agencies directly involved in the air quality response and monitoring, the New York City Departments of Health and Environmental Protection, and outside experts.

Specifically, EPA's goals in forming this panel and holding the current and planned meetings are:

- To obtain more input on ongoing efforts to monitor the situation for New York residents and workers impacted by the collapse of the WTC.
- To help guide EPA's use of the available exposure and health surveillance databases and registries to characterize any remaining exposures and risks, identify any unmet public health needs, and recommend any steps to further minimize the risks associated with the aftermath of the WTC attacks.

In discussions with the Council on Environmental Quality and interested parties on Capitol Hill, a set of charge questions was developed for the technical panel. Within 3 to 6 months, the panel is charged with reviewing documents summarizing the following:

- Post-cleaning verification sampling in the residential areas included in EPA's Indoor Air Cleanup program to verify that recontamination has not occurred from central heating, ventilation, and air conditioning (HVAC) systems.
- The "World Trade Center Indoor Air Assessment and Selection of Contaminants of Concern and Setting Health-Based Benchmarks," which concluded that asbestos was an appropriate surrogate in determining risk for other contaminants.
- An additional, longer-term goal for the panel is to guide the Agency's use of the available exposure and health surveillance data to characterize remaining exposures and risks, identify unmet public health needs, and recommend any steps to further minimize the risks associated with the WTC collapse.

The second meeting convening the expert technical review panel occurred on April 12, 2004, at the Tribeca Performing Arts Center in New York City. This meeting was announced in the Federal Register and was open to the public. This report is a summary of that meeting.

Information on subsequent meetings will be announced on EPA's website (http://www.epa.gov/wtc/panel). Interested people can also get information on these meetings by calling 1-800-803-2833.

1.1 Purpose of the Meeting

The purpose of the second meeting was to:

- Revisit the Draft Resampling Protocol based on issues raised at the March 31, 2003, meeting.
- Review the appropriateness of using asbestos as a surrogate for other WTC contaminants.
- Receive comments from the public.

1.2 Agenda for the Meeting

Registration and check-in for the meeting began at 9 a.m. in the lobby of the Tribeca Performing Arts Center. Preregistration for observers and commenters was available online at http://www.epa.gov/wtc/.

Paul Gilman opened the meeting by welcoming panel members and audience participants, and then reviewed the goals for this meeting. Then Henry Kahn, a statistician with EPA's Office of Research and Development (ORD), National Center for Environmental Assessment (NCEA), presented an overview of some issues discussed at the first meeting of the technical panel regarding the Draft Resampling Protocol. Some panel members followed his presentation with clarifying questions. Next, Mark Maddaloni, a toxicologist with EPA's Region 2, reviewed analytical issues associated with the Draft Resampling Protocol. Some panel members also followed this presentation with clarifying questions and discussion. After this panel discussion, the members of the panel and EPA received public comments. The morning session was concluded at 12:37 p.m.

The meeting reconvened at 1:45 p.m. Charles Nace, of EPA Region 2, opened the afternoon session with a presentation on the appropriate use of asbestos as a surrogate for evaluating the risk from other WTC contaminants. Some panel members asked clarifying questions and discussed the topics that EPA presented. Then Matthew Lorber, from NCEA, described the process and results of EPA's peer review on the topic of using asbestos as a surrogate. He then led a panel discussion on that subject, during which some of the panel members brought up topics including the contaminants of potential concern, the purpose of the recontamination study, the sampling methods in the protocol, and the general sampling design. Gilman summarized these discussions by presenting next steps for the members of the panel. The afternoon session was followed by more public comments. Gilman adjourned the meeting at 5:50 p.m.

The formal agenda distributed for this meeting is attached as Appendix A. The panelists' biographies are provided on EPA's Web page (http://www.epa.gov/wtc/panel/members.html).

2. WELCOME, PURPOSE OF MEETING, AND OPENING REMARKS
Paul Gilman, EPA Science Advisor
Paul Lioy, Professor of Environmental and Community Medicine at the Environmental and Occupational Health Sciences Institute of the Robert Wood Johnson Medical School–University of Medicine and Dentistry of New Jersey and Rutgers University

Gilman opened the meeting by welcoming the members of the panel and audience participants. He reviewed the panel's purposes, which included receiving feedback from the technical panel on EPA's Draft Resampling Protocol for investigating the issue of recontamination in spaces that were cleaned in the first Residential Assistance Program. Gilman stated that EPA seeks to understand the issues associated with the availability of data and to be forward-thinking in efforts to minimize risks associated with the WTC and any future attacks. EPA's objectives for the panel, he said, would be further clarified after the presentations and discussions, and summarized at the end of the meeting.

Gilman explained that the meeting was meant to address two specific elements of the panel charge:

- Review of the proposed plan for post-cleaning verification sampling.
  - Determine whether HVAC systems have caused recontamination.
  - Review the WTC Residential Confirmation Cleaning Study.
  - Review input from the last meeting.
  - Discuss the use of asbestos as a surrogate, including input from an outside peer review panel.
- Consideration of a number of points.
  - Find areas in which the health registry can be enhanced.
  - Discuss issues related to geographic extent in revisiting questions related to the health registry and the Draft Resampling Protocol.
  - Discuss how to move forward.

Gilman asked the panel members if there were any questions of clarification on these objectives.

A panelist, Krish Radhakrishnan, Director of the Asbestos Control Program at the New York City Department of Environmental Protection (NYCDEP), noted for the panel that since the last technical panel meeting, NYCDEP had recompiled the cleanup chronology associated with the 114 Liberty Street cleanup and information on clearance sampling. He said he had forwarded this information to the panel members.

Panel members raised no other comments or questions.

3. REVISIT DRAFT RESAMPLING PROTOCOL

Henry Kahn, a statistician from NCEA, and Mark Maddaloni, a toxicologist from EPA Region 2, made a presentation revisiting issues associated with the Draft Resampling Protocol that were raised at the March 31, 2004, technical panel meeting. These presentations were followed by questions from some members of the panel and discussion.

3.1 Issues Relating to Resampling Protocol—Aggressive Sampling and Common Space Areas

Henry Kahn, EPA ORD NCEA

Kahn made a presentation on two issues raised at the last technical panel meeting:

- Sampling of apartments using the "aggressive method."
- Sampling of common areas sampled in a previous study.

Kahn noted that there were multiple stratifications within the population of 4,167 apartments that were included in the prior Residential Assistance Program. One of the groups was a set of apartments that were aggressively sampled.

Kahn reviewed the methodologies for performing both modified and aggressive sampling for comparison, including the burdens imposed on residents and the results of these sampling efforts. He reviewed the confidence intervals associated with the data produced by both methods, and discussed related issues associated with the size of the sample population. Kahn reviewed considerations for comparison between the aggressive and non-aggressive methods.

Finally, Kahn ended his presentation asking for clarifying questions.

3.2 Panelist Discussion and Clarifying Questions Related to the Resampling Protocol—Aggressive Sampling and Common Space Areas

Morton Lippman noted that listeners could be easily confused by the use of the term "exceedance." As it is used here, "exceedance" is related to long-term exposure limits, not ceiling limits. If the actual risk associated with an exceedance were to be presented, it would be infinitesimally small: the samplers are encouraging every settled particle to become reentrained, producing an aggressively sampled environment that only lasts for the duration of the test. This does not represent the realistic asbestos hazard. It would be helpful to the members of the panel and the audience if EPA reviewed what the sampling results mean in terms of exposure to asbestos and health-based standards. The way these data are presented here could lead the audience to conclude that their apartments are acutely hazardous.

Kahn responded that the sampling protocol contains the derivation of the limit based on which an exceedance is determined. An "exceedance" reflects a sample that had a value

in excess of the health-based benchmark. He further explained that the use of showing the number of exceedances in this presentation is simply to demonstrate the need for a large number of samples in order to reduce the confidence interval.

Paul Lioy, the panel co-chair, added that he agreed that the long-term risk issue is small, because the protocol uses aggressive sampling and therefore reentrainment of perhaps otherwise stagnant particles.

Lippman explained that his issue is not in the way the data are treated but rather how they are described. "Health-based standard" and "health-based exceedance" mean very different things. The word "exceedance" means something different between agencies and perhaps even legally. EPA should provide a frame of reference on these definitions.

Gilman summarized this discussion by clarifying Lippman's comment that exceedances in this case were simply triggers to initiate cleanup. Maddaloni concurred, noting that "exceedance" is used in a generic sense in this case.

3.3 Issues Relating to Resampling Protocol—Asbestos Settled Dust Sampling Methods

Mark Maddaloni, EPA Region 2

Mark Maddaloni, a toxicologist with EPA Region 2, made a presentation on the methods used to sample asbestos in the initial Residential Assistance Program and in the Draft Resampling Protocol.

Maddaloni compared the different methods used to collect asbestos dust samples during the initial program, including microvacuum and wipe sampling. He also reviewed the methods used to analyze these samples, including:

- Transmission electron microscopy (TEM)–phase contrast microscopy (PCM) analysis.
- TEM–Asbestos Hazard Emergency Response Act (AHERA) analysis.
- TEM–nonasbestos fibers.
- PCM–NIOSH 7400.

Maddaloni then discussed the determination of detection limits for each of these analytical methods, the definition of "exceedance" as it is used in this study, duplicate and replicate sampling, and the confidence interval associated with these studies.

3.4 Panelist Discussion and Clarification Questions on Asbestos Settled Dust Sampling Methods

Greg Meeker noted that in order to achieve a target level of detection, the analyst combined three or more samples per apartment to create one analytical sample. In these cases, EPA should be clear that one sample was analyzed with a particular detection limit rather than the three samples with higher detection limits.

Lippman noted that EPA's clarification on the definition of health-based standards was helpful. He further noted that, in comparing the previous study to the proposed study, EPA should be careful to consider the impact of low analytical results within each apartment, because there is high relative uncertainty surrounding these low analytical results. These data by themselves do not provide an adequate assessment of whether a particular apartment is clean. People should not believe that a resampled apartment that meets clearance criteria is necessarily cleaner than before.

Catherine McVay Hughes relayed that one consultant used a leaf blower on her HVAC system and collected particulate on the filter in the HVAC. She asked for clarification if the purpose of the resampling is to determine if HVAC systems are recontaminating space or just to determine whether space is recontaminated.

Lioy answered that he believes the use of a leaf blower in the HVAC has the same effect as the use of a leaf blower in the house. The purpose is to see if material still exists in the HVAC that could resuspend if a 100-mile-per-hour wind came through. He noted, however, that panel members should be cautious of how those results are explained and in what context. The terminology used in describing the issue of recontamination versus the presence of material in a room is very critical, because these are two different things.

McVay Hughes further noted that since the HVAC is not necessarily running all year, the season when the HVAC is tested is very important. Lioy noted that the time of year may only be important to certain testing. He stressed the importance of being very clear about what questions are being asked and what questions EPA can answer with different types of sampling.

Radhakrishnan noted that there are limitations to the microvacuum sampling method. For example, the collection efficiency depends on the type surface, which means you cannot compare the results between surfaces.

Gilman reminded panel members of prior discussion regarding wipe samples and microvacuum sampling. During the last meeting, a suggestion had been made to collect wipe samples in HVAC systems for purposes of interpretation of information. At the present meeting, panel members were again discussing this possibility of supplementary sampling to better interpret the data collected in the air samples.

Lioy asked EPA to verify that their presentation described three possibilities, including wipe samples, microvacuum sampling, and TEM analysis for non-asbestos fibers, with the inference that if you measure positive samples, you might look further for other analytes, such as glass fibers and cement dust. Maddaloni agreed that those are options that are available, and there is an archive of samples available that may be analyzed for those four metrics at the 4,000 apartments in the program.

David Newman commented that there are notable limitations to each of the sampling methods. In sampling asbestos, one should be concerned with the availability of the

asbestos in air. Settled dust on porous and non-porous surfaces may or may not become entrained in air. There is no science basis for linking health risks to surface contamination.

McVay Hughes asked if the bulk material sampling method could be performed in an HVAC unit. Radhakrishnan answered that it can if there is enough material. Newman also noted that wipe samples can also be collected in the HVAC unit.

4. APPROPRIATENESS OF THE USE OF ASBESTOS AS A SURROGATE

Nace reviewed how asbestos was selected to as a surrogate for the Residential Assistance Program. Then Lorber, of NCEA, presented the results of the external peer review of "Use of Asbestos as a Surrogate for Other WTC Contaminants." Some members of the panel asked clarifying questions following each of these presentations.

4.1 Selection of Asbestos as a Surrogate
Charles Nace, EPA Region 2

Nace reviewed the method through which the surrogate was selected for use in the Confirmation Cleaning Study. Many surrogates were tested, including:

- Asbestos
- Man-made vitreous fibers (MMVF)
- Lead
- Alpha-quartz
- Dioxin
- Polycyclic aromatic hydrocarbons (PAH)

For a test sample of apartments, these analytes were measured after an initial cleaning to determine if the analytes were present above health-based standards. If any analytes were present, the apartments were recleaned and resampled until all sample analytes met health-based standards. Additionally, Nace discussed the practice of cleaning an apartment if any sample was overloaded from that apartment

The results of these analyses indicated that the health-based standard for asbestos was the most difficult one to meet in these apartments. Nace presented the results of these sampling events and the conclusion of the study, which was that cleaning to meet the asbestos health-based standards also met the health-based standards for MMVF, lead, alpha-quartz, dioxin, and PAH.

4.2 Panelist Discussion and Clarifying Questions

During the presentation, Lippman asked if these asbestos data were airborne concentrations, and Nace indicated that they were. Lippman then asked how lead was sampled, and Nace responded that lead was measured in the wipe samples.

David Prezant asked where microvacuuming occurred. Nace clarified that microvacuum samples were taken on porous surfaces such as couches and chairs within the apartments.

Newman asked for explanation on the 0 percent finding for contaminant cleanup in one of the apartments. Nace explained that in one apartment, the MMVF analysis indicated that the second cleaning did not decrease the levels of MMVF found previously. Therefore, the cleanup efficiency was 0 percent.

Lippman asked for clarification of the word "important" in the statement "Potential for long-term health impacts from asbestos exposure was deemed important." Maddaloni answered that EPA was trying to point out that there are benchmarks against which samples were measured—benchmarks the cleaning was trying to attain in the Confirmation Cleaning Study. These are health-based benchmarks, and for asbestos, the benchmark was developed for a 30-year continuous exposure. EPA's cleanup goal was to get below that benchmark, and EPA deemed that "important." It is an upper-bound estimate. Lippman suggested that EPA provide a median and an upper-bound cancer risk estimate to better indicate the actual risk to asbestos-related cancer.

Prezant asked for clarification on what the microvacuum samples were analyzed for. Nace and Maddaloni said they would follow up with the panelists on that question.

Newman asked what conclusion was drawn regarding the adequacy of the cleanup, given the fact that overloaded filters were collected after spaces were cleaned. Nace stated that these results did not necessarily indicate the adequacy of cleaning, since "overloaded" only meant that the filter was 10 percent loaded. Overloaded filters did indicate the need for additional cleaning, and in fact any spaces producing such filters were automatically recleaned.

Newman also pointed out that the resampling effort might encounter more overloading cases, since these apartments have not been cleaned in a while. With the initial sampling, the spaces had just been cleaned. This resampling is occurring much later.

Steven Markowitz asked if COPC were found in apartments prior to the first cleaning. Nace responded that pre-cleaning air test samples were not collected because of the concern for filter overload, but pre-cleaning microvacuum and wipe samples were collected that contained the COPC. EPA will provide those results to panel members including the sample method and the number of samples.

Prezant asked what the protocols for cleaning the subject spaces were. Nace indicated there were specified protocols for cleaning, after which the spaces were visually inspected and then tested. The protocols are documented in the cleaning study report. Prezant continued that there seems to be some concern among some members of the panel about the level of cleaning. If his grandmother were in charge of cleaning, there would be no perceived need for retesting because there would not be any dust anywhere—in other words, the public might feel better about the risk level if there were no visible dust in their apartments.

Jeanne Stellman said that looking at all of these residences is such an overwhelming task that it might have made more sense to do some in-depth air sampling, then conduct in-depth cleaning based on a cleaning protocol developed from the results, with intermittent spot tests. Stellman noted that she was confused by the last comment on the last slide, which states that asbestos sampling was most conservative when overloaded filters were included in the decision tree for determining whether additional cleaning events were required. If six out of eight measurements were overloaded, then how does this say anything about asbestos at all, since 75 percent of the samples could not be analyzed? Nace clarified that it was the asbestos air sampling method. If the sampling method failed, then recleaning was required for that apartment. Stellman continued that she did not think that these are useful data to use in evaluating the adequacy of asbestos as a surrogate.

McVay Hughes expressed some concern with the testing protocol. In her building's common space, she said, the pump was not operating during lunch. When the technician returned, she inquired about this; the technician said it was not a problem because "the pump goes off all the time."

Lioy asked if anyone returned to the apartments to inspect the cleaning and verify that there was no visible dust. Pat Evangelista, EPA Region 2, stated that a different contractor was responsible for conducting post-cleaning inspections, and that contractor followed a quality assurance checklist to conduct the inspections. Lioy asked EPA to clarify where the post-cleaning inspector was instructed to look for visible dust. EPA indicated that it would forward the protocol to panel members.

Newman indicated that two surrogates have essentially been proposed: 1) WTC dust with visual inspection and 2) asbestos. There is some validity to the visual-inspection method, but the absence of visible dust does not necessarily indicate the absence of asbestos from WTC.

Stellman noted that the correlation of lead contamination to the asbestos values in the comparison of post-cleaning testing does not support the use of asbestos as a surrogate for lead.

Lippman asked for clarification of the method used to clean soft surfaces. Nace stated that most residents chose to discard most of these items. Only one apartment had soft surfaces remaining in recleaning activities. Porous surfaces were cleaned using a wet vacuum method. McVay Hughes verified that this was the method used to clean the hallway and common areas in her building. She added that in her own apartment, which had no broken windows or other breeches, significant amounts of dust were settling on the hard surfaces the day after the apartment was cleaned.

4.3 Results of the External Peer Review of the Use of Asbestos as a Surrogate for Other WTC Contaminants

Matthew Lorber, EPA ORD NCEA

Lorber's presentation covered the external peer review on the use of asbestos as a surrogate. He discussed the process by which a peer review is conducted, listed the reviewers and their affiliations, presented the charge to the peer reviewers, and then outlined their conclusions.

An EPA contractor selected peer reviewers based on their expertise in asbestos. The following five reviewers were selected:

- Gary Ginsberg, Connecticut Department of Public Health
- Annette Guiseppe-Elie, Dupont Engineering
- John Kominsky, Environmental Quality Management, Inc.
- Robert Nolan, Center for Applied Studies of the Environment
- Clifford Weisel, Rutgers University, Environmental and Occupational Health and Safety Institute

The reviewers were provided with EPA's "World Trade Center Indoor Air Assessment and Selection of Contaminants of Concern and Setting Health-Based Benchmarks" and other relevant documents. The reviewers were asked if these documents, along with all other data sources they are aware of, support the selection of asbestos as a surrogate for determining the risk from other contaminants (in that manner used by EPA).

Three peer reviewers concluded that asbestos was an appropriate surrogate. Two panelists did not. A complete report summarizing the reviewers' findings will be completed in late April 2004.

4.4 Panelist Discussion and Questions on the Results of the External Peer Review of the Use of Asbestos as a Surrogate for Other WTC Contaminants

Stellman commented that this sampling program should not interchange air sampling and wipe sampling results and the associated risk. Lorber agreed that these two types of sampling should not be necessarily used interchangeably, and each needs to use independent benchmarks for assessing risk.

McVay Hughes asked for clarification on how the peer review panel was established. Gilman responded that EPA's contractor selected the peer reviewers based on a set of criteria that EPA requires. EPA's contractor coordinated with the reviewers, including compensating them for their time.

Gilman asked panel members to comment on EPA's proposal to use asbestos as a surrogate in the resampling effort. Lippman stated that it seemed this was the easiest

protocol to follow in order to be consistent with what was done previously. He expressed some concern, though, that this may not add to the state of knowledge.

Stellman expressed confusion over why recontamination is the driving issue instead of the extent of contamination, especially given the difficulties that occurred during the first sampling events. Many public commenters indicated serious flaws in the protocol conduct. Stellman suggested that panel members could offer some recommendations to EPA on the resampling effort to address some of these issues. Gilman agreed that EPA would like to receive comment on this issue. The first topic on which EPA solicits comment, however, is apartment recontamination as it is described in the proposal. Stellman asked for clarification on whether EPA was seeking comment on the use of asbestos as a surrogate, and EPA confirmed this.

Stellman stated that she believed asbestos failed as a surrogate, but EPA needs to clarify how asbestos results will be used. Gilman clarified that EPA was asking if the surrogate is appropriate for the Region 2 Clean-Up Program, and not necessarily to represent WTC contamination.

Markowitz noted that the issue is not so much recontamination as whether their HVAC has been a reservoir for contamination, and what other sources may play a role. Markowitz believes the question is whether there is contamination. If EPA is not required to use the same methods as before for comparability, then perhaps better methods may be employed.

Lippman noted that resuspending particles is not that easy. It is technically possible, but he had little enthusiasm for going into the same apartments and sampling using the same methods. He thought it would be useful to identify the contaminant in the original exposure that caused such a response in the affected population.

Lioy recalled a prior discussion on whether it might be a good idea to abandon asbestos as a surrogate. Perhaps the protocol could sample for contamination available from wipe samples, and asbestos could be sampled as a backup to these wipe samples. Stellman suggested adding lead and PAH to these analyses. Lippman noted that lead can be tracked from parks, street dust, and other sources external to the apartments and may be a significant issue. Prezant noted that firefighter blood testing indicated that 1 out of 10,000 firefighters had a measured increase in the lead in their bloodstream, so he did not believe that lead was as much of a concern as vitreous fibers.

Prezant believed that if a wipe test for specifically identified areas could be defined, and a surrogate for visual cleanliness could then be defined, then a useful test could be conducted. He believed that EPA should consider issues beyond recontamination, including the identification of buildings in which some apartments, common areas, and office spaces were cleaned and others were not.

Jessica Leighton noted that the schools have been so extensively cleaned and tested that they may not be good options for consideration in a new sampling program. Leighton

suggested that another option might be to examine blood test data from children less than 12 years of age.

Captain Sven Rodenbeck suggested that the sampling program conduct a general screen of Lower Manhattan instead of following the Draft Resampling Protocol for resampling, which includes only those spaces that were previously sampled.

Meeker indicated agreement with the idea of sampling for other WTC contaminants. He believes that slag wool, a type of MMVF used at the WTC, has a very distinctive composition, and may be able to be used with asbestos as a fingerprint for WTC contamination. Lioy suggested that EPA return to the background samples to try and determine if a fingerprint for WTC contamination could be established using these noted considerations.

Lioy and Lippman discussed the need to define caveats related to background samples in order to try and identify a WTC fingerprint. Meeker noted that slag wool is widely used in buildings. So in order to use this "signature," one would need to make sure that there was not slag wool in the background of the sample environment. A quantitative chemical analysis of the fibers can be plotted. For cement, one may be able to ratio the quantities of the materials to determine if the substance is from the WTC. There are archived background samples from this study as well as archived WTC samples that are available for analysis.

McVay Hughes indicated that Deutsche Bank, at 130 Liberty Street, was so badly damaged that it will be demolished. Therefore, she would think that the firehouse would want testing to be conducted for its personnel's safety. Prezant noted that he did not think they would object as long as it is clear what the collected data would show, and as long as they were able to maintain a functional garage at all times.

Newman summarized that there were three proposals being discussed currently:

- The original proposal for a recontamination study
- A redoubling of efforts to collect data
- A more comprehensive study including locations not in the original program

He believed that the COPC were a good place to begin, but other contaminants could be considered. Newman asked if mercury could be considered as an analyte. Lioy thought perhaps this was appropriate. Patricia Clark noted that there is a backlog of samples collected for asbestos, vitreous fibers, and silica, some of which are air samples and some wipe samples. While these are worker samples, and therefore cannot be compared to post-cleanup samples for clearance, they may still be useful.

Markowitz made three comments for panel members' consideration. First, he noted that someone had referred to resources in completing this sampling. Markowitz does not feel that the panel member's roles are to determine resources—rather, they are to determine the most appropriate protocol. Second, the original charge instructs the panel members to

verify that recontamination has not occurred from HVAC systems. Whether or not this portion of the charge is possible, the panel members need to specifically address it. Finally, Markowitz noted that he is uncomfortable raising concerns from the public, lest he misrepresent their concerns. He believes a much better option is to have a parallel effort in which the community is directly involved in some of these decisions.

Joseph Picciano agreed that the panel members needed to be responsive to the original question that was asked. Lioy agreed, and asked the panel members if they thought an adequate sampling of HVAC systems could be performed, and if that would indicate something about how well Lower Manhattan was cleaned.

Prezant suggested that HVAC should be tested as much as it is possible, and in buildings that contain a full sample of the types of areas that are of interest, including HVAC, cleaned areas, uncleaned areas, offices, and residences.

Lioy asked the panel members about having a broad-based protocol to collect wipe samples at HVAC inlets to apartments. Stellman suggested that this be performed in two stages: collect a wide set of samples and examine the results, then let those results define the second stage.

McVay-Hughes noted that a contractor took a sample from her HVAC system; the process was quite simple and non-intrusive. She noted that a number of building owners had contractors completely clean their HVAC and conduct testing. If these data could be made available, or if those contractors could be hired to discuss the results in general terms, it might greatly benefit these discussions.

Gilman said it seemed that some members of the panel were suggesting looking at the issue of recontamination in a broader sense than had been proposed. Prezant agreed that this was a good idea, as long as the panel members were answering EPA's charge. He thought resampling should include previously unsampled apartments as well as cleaned and uncleaned spaces.

Stellman recommended that focus groups be formed within the community to ensure that the sampling program will address their questions as well as EPA's requirements. She suggested two stages to the focus group:

1) Use the community to generate the questions for the focus group and technical panel.
2) Formulate the design of the charge to the focus group with that community input.

Prezant enthusiastically agreed with this suggestion, adding the following:

- Focus group members should consist of board members or residents of the apartment building in which the testing will occur.
- Five or ten different buildings could be studied with different focus groups or a single focus group with representatives from each building.

Markowitz was concerned that a more formal advisory process that involves members of the community should be established, rather than trying to scientifically formulate questions, find a representative sample for focus groups, and then have the focus group comment on the questions.

Leighton emphasized the need for better defining the community appropriate for these focus groups. She recommended that broad categories within the community be represented in any community outreach, including those members of the community who have chosen not to participate in the prior sampling program and these public comment sessions. Prezant agreed with this comment, noting that the public should be invited to comment specifically on what is the agenda for the day.

5. SUMMARY AND NEXT STEPS

Paul Gilman, EPA ORD

Gilman summarized his impressions of the panel members' comments.

- Members of the panel place a higher value on a different approach to addressing the question of recontamination in a different survey that might be informative to the later questions on the panel charge.
- Members of the panel place a higher priority on an initial screening effort before a full sampling program is implemented. This effort would include public buildings, schools, fire stations, and commercial areas.
- The program should look at a select number of buildings to investigate the question of whether HVAC systems might be the source of recontamination. The program should identify buildings where some apartments have been professionally cleaned or cleaned by individuals and residents.
- Focus group activities should include learning which issues the community would like the program to address, as well as the community reaction to the questions that would be answered by such a study. A very important first step for this is to develop those questions (i.e., what are we trying to address with these different approaches?).
- Members of the panel believe that the sampling program should be expanded to include analytes other than asbestos, with the following considerations:
  - Continue to address the contaminants of potential concern.
  - Consider particulates and fibers.
  - Try and develop a signature for the dust that might be informative for that screening effort.

5.1 Comments on Paul Gilman's Summary

Lippman agreed with Gilman's summary. He also emphasized the importance of identifying a tracer for WTC contamination. If the glass fibers from the WTC have a unique signature, it would be much easier to differentiate background from WTC contamination.

Prezant asked if EPA could identify candidate buildings that would make good targets for sampling background as well as WTC contamination, including those buildings immediately outside Canal Street. Considerations for selection would include:

- Buildings should be large and multi-use.
- Buildings should contain cleaned and un-cleaned residences and offices.
- Buildings should be publicly owned: access to such buildings may be less of an issue.

Stellman continued this thought noting that community input is very important in selecting buildings. Members of the panel agreed that EPA could select multiple buildings in various locations for consideration by the community and the panel members.

5.2 Paul Gilman's Next Steps

The panel members should become more informed on the breadth of the health effects work being performed by the National Institute of Environmental Health Sciences and the Agency for Toxic Substances and Disease Registry, with an eye toward identifying data gaps. Public comments over the past two meetings have demonstrated that the study focus has been on long-term effects, and the panel members' discussions and public comments have been associated with acute effects such as those caused by fibers.

The panel members should become more informed about the other acute effects health data that exist, including the firefighter health data. The community will look to the panel members to interpret these data for the community.

EPA's Center for Homeland Security includes programs for water safety and rapid risk assessment, as well as a buildings program. Gilman has asked these researchers to address community health effects from building contaminants, including research into HVAC systems. Gilman has also asked the researchers to work with the people in New York City to better understand the nature of contamination. Members of the panel should provide input to the researchers creating this parallel research effort within EPA's National Homeland Security Research Center in the building safety arena, using the experience of the WTC to help EPA generalize preparedness for events like the WTC.

Members of the panel should continue efforts to better define the study that will address this question of recontamination, but will also feed into the broader set of questions (regarding geographic extent of contamination, sampling analytes, etc.).

EPA will think through the results of Gilman's summary and subsequent panelist comments and develop a straw man to distribute to members of the panel and the community for discussion at the May 12 conference call. Members of the panel should provide individual recommendations on how they think EPA should move forward on

developing the screening study, including comments on the strengths and weaknesses of this effort. EPA will consider these comments in preparation for the May 24 meeting.

6. PUBLIC COMMENTS

EPA solicited public comments in a morning public comments session as well as an afternoon session. Eleven comments were presented in the morning session and 10 more were presented in the afternoon. All of the public comments submitted in writing are contained in B to this report.

6.1 Marilena Christodoulou

Marilena Christodoulou was the president of the parents' association for Stuyvesant High School from 2000 through 2002. The students and staff of Stuyvesant High School were evacuated on September 11, 2001, through a toxic cloud of dust and debris. The Board of Education reopened the school on October 9, 2001. Christodoulou is concerned that children returned to school before safe conditions existed. The children were sent back to school with specific assurances from the Board of Education and the New York City Department of Health that the inside of the school was completely clean, including the HVAC, and that the outdoor air quality immediately outside of the school was safe for children. Neither of these assurances proved to be true.

Government officials failed to take the necessary measures to protect children and public officials continually misrepresented the situation.

The Board of Education conducted an asbestos abatement of the school prior to reoccupancy but the HVAC was not cleaned, filtration was not upgraded, and carpeting was not cleaned. While under the threat of litigation, the Board of Education cleaned the HVAC in summer 2002 and the carpets were replaced in December 2003. Another contributing issue was that the waste transfer barge was located next to the school's HVAC intakes.

Christodoulou presented four primary concerns:

- Why did the sampling design exclude schools and workplaces?
- Recontamination has been occurring in buildings and at Stuyvesant.
- Asbestos is not an adequate surrogate.
- There are additional health monitoring needs, especially among affected students and children.

After the original asbestos abatement in October 2001, the Board of Education conducted daily environmental testing in the school, which has been forwarded to EPA. This monitoring indicated that recontamination was occurring, primarily through the ventilation system, and exceeded levels established to protect children's health. Christodoulou presented a summary of her knowledge of any monitoring, testing, and cleanup that was performed at the school and outside the school, and summarized the

symptoms that staff and children are experiencing. All of the data that the parents' association has collected have been submitted to EPA. An informal survey conducted by the association found that several hundred students had new or exacerbated respiratory symptoms well into the summer of 2002. The National Institute for Occupational Safety and Health (NIOSH) began a study on the environmental and health conditions among the staff. This study was never completed, but the preliminary results indicated that 50 to 60 percent of the staff reported respiratory symptoms after 9/11. Christodoulou asked that the members of the panel and government "do the right thing" by addressing these issues.

6.2 Stanley Mark

Stanley Mark is the Program Director at the Asian American Legal Defense and Education Fund (AALDEF). He was originally to speak at the first meeting of the technical panel, but could not due to the flooding pipe and subsequent evacuation of the meeting. He was speaking at this meeting on behalf of the residents of Chinatown and the residents on the Lower East Side on EPA's failure to provide testing for all residents of Lower Manhattan.

Mark described the services and client base of AALDEF, explaining that some of his clients include victims of the WTC. Mark then presented some comments related to the health and monitoring of his clients.

AALDEF has worked with other agencies and organizations to provide assistance to thousands of residents and workers who were not included in the original government assistance programs. AALDEF clients living in Chinatown and the Lower East Side are experiencing respiratory illnesses and suffer from rashes that are attributable to the 9/11 attaches. Mark reviewed the studies of Dr. Allen Cho, a physician at Charles B. Wang Health Center and a coauthor of a study conducted by Stonybrook University School of Medicine and the University of Pittsburgh School of Public Health. Cho's results should be considered in the design of any new sampling program, including an extended geographic area of at least 5 miles beyond Ground Zero.

Another study that would be useful for consideration in the program design is one by Dr. Joan Ryman, associate professor of environmental medicine at NYU School of Medicine and director of the Asthma Center. She measured the sharp increase in the incidence of asthma and respiratory problems after 9/11 in Chinatown and the Lower East Side, and her results (to be published shortly) cover the areas of Chinatown and the Lower East Side.

Through demonstrations here and in Washington, D.C., thousands of Chinatown residents are demanding health care coverage, research, and medical treatment. Government agencies and officials should be held accountable for the delay in implementing full health studies and treatment for those affected by 9/11, as well as the failure to alert people to the risks in Lower Manhattan.

Given the wide scope of harm and shortage of resources and studies available to help people of color in Chinatown and the Lower East Side area, Mark asked for a stronger commitment from leaders and institutions to make these resources available. The short-term and long-term effects have not yet been addressed for these residents.

6.3 Jo Polett

Jo Polett is a resident of Duane Street, seven blocks north and a block east of the WTC. She is a resident in a 52-story building constructed in the late 1980s, and her apartment was one of the 2,220 apartments that EPA tested for heavy metals and dioxin before and after cleaning.

Polett described the results of the wipe sample analyses in her apartment and of other samples in other apartments. These results exceeded health-based benchmarks. Polett indicated that post-cleaning sampling more than a year after 9/11 found four exceedances for lead, two of which were quite high.

Polett repeated that her building was constructed well after concern over lead-based paint methods began to be taken into account—her building was contaminated and recontaminated with lead after 9/11. Given these data, Polett was concerned that EPA maintains that, because so many homes in the Northeast have significant lead-based paint hazards, EPA cannot determine whether WTC debris and dust caused lead contamination. Further, Polett believes that EPA should have been more concerned about those buildings with existing lead levels, because children there received exposures from both their buildings and WTC lead.

Polett suggested that EPA knew there was lead contamination by October 2001, and asked why the families weren't made aware of this contamination. Families could have made different decisions if they were told the facts.

Polett made the following corrections to what had already been stated:

- NYCDEP was responsible for cleaning building exteriors, and cleaned 323 buildings and cleared 750 buildings. Her building was one of those. In January 2002, Polett had her building examined by a certified industrial hygienist, who noted WTC debris and dust on window ledge and recommended that the exterior of the building and roof be cleaned by people trained in asbestos abatement.
- EPA has indicated that it will use the same sampling method for asbestos to be consistent with the prior sampling survey. This is not possible, because the post-cleaning data were not generated reliably. The contractors did not follow protocols and residents describe sampling personnel who were untrained in the methods or were trained and ignored the protocols or personal protection equipment.
- EPA notes that aggressive testing captures six times the sample that modified-aggressive testing does. This indicates that the modified-aggressive method is not working.

Polett concluded her comments by expressing her concern for the subpanel that was asked to review the documentation for the use of asbestos as a surrogate. Because the documents they used in their determination were EPA documents, they contain the EPA perspective; no one from the community has had the opportunity to provide a reality check for what really happened in these apartments.

Additionally, only one of the six documents given to the panel for background was peer-reviewed. The peer review committee recommended that after revision, the report should be subject to a second peer review, but EPA has declined to do this.

6.4 Jenna Orkin

Jenna Orkin is a member of the 9/11 Environmental Action community group's steering committee. She began her comments by noting that this environmental disaster has been called "unprecedented"; however, in crucial ways, the environmental consequences of 9/11 do have some precedence, and EPA has established protocols for cleaning up the contaminants from such disasters. Orkin asked why these protocols are not being followed for this disaster.

Orkin continued, saying the fact that this disaster was greater than prior disasters is all the more reason for state-of-the-art testing and cleanup. (She referred panel members to a memorandum from Kate Jenkins dated July 4, 2003.)

The panel members should consider whether it is reasonable to assume that one contaminant can serve as a surrogate for all WTC contaminants. The WTC contained asbestos, mercury from flourescent bulbs, 50,000 computers (each made with lead), and smoke detectors that may have contained americium 231.

Additionally, Orkin quoted from EPA documents presenting dioxin and PCB measurement data from WTC, which indicated high levels of these contaminants. She noted that EPA should not neglect dioxin or fine particulate matter in their sampling evaluations.

Orkin continued, saying that asbestos contributed less than $1/300^{th}$ of the total debris. The remaining contaminants must also be cleaned up. The decision to use asbestos as a surrogate, she said, should not be left to a panel composed of industry representatives and experts selected without input from the public. Again, EPA should consider all of the COPC.

6.5 Charlotte Hitchcock

Charlotte Hitchcock is the Health and Safety Officer for the Association of Legal Aid Attorneys, Local 2325, of the International Union, United Automobile, Aerospace, and Agricultural Implement Workers of America.

Hitchcock provided a brief description of the Association of Legal Aid Attorneys. The building housing the Association was badly damaged in the WTC disaster. Hitchcock described a delay in the emergency response from EPA and described the results of hiring an independent firm to test the building.

Hitchcock's complete written comments are provided in Appendix B.

6.6 Kimberly Flynn and Suzzane Mattei

Kimberly Flynn (of 9/11 Environmental Action) and Suzzane Mattei (of the Sierra Club) presented comments. They expressed concern over the asbestos peer review panel: it was established through a process that was not accessible to the public, it did not hear the public comments, it was (asserted Flynn and Mattei) not announced at the last meeting, and there needs to be a review of conflict of interest issues related to it. Further, they believe that EPA's test program should include not only asbestos, but also all of the COPC.

Flynn and Mattei closed their comments by noting that public participation and oversight are critical to this process, and urged EPA to continue efforts to make these panels and meetings transparent, including posting conflict of interest forms and curriculum vitae. Detailed meeting notes must remain public. Finally, EPA must not use the existence of this panel or the side peer review panels as an excuse for further delaying cleanup.

The written comments from Flynn and Mattei are included in B.

6.7 Caroline Martin

Caroline Martin is the Board President at Collect Pond House, 366 Broadway. Martin presented statements on the whole-building cleanup that occurred at her building. The protocols called for pre-cleaning inspection. On February 26, 2003, three people came for this pre-cleaning: Robert Fitzpatrick of EPA, Mark Nakanovich of ATC, and Andrew Constance of ASCS. She accompanied them to the roof and asked what they were looking for in the mushroom tops of the ventilation system. They indicated they were looking for WTC dust. She observed buildup of dust in the ventilation shafts, but EPA indicated that this was not WTC dust because it was gray and WTC dust was brown-gray.

During the rooftop inspection, a resident came to the roof. Martin asked her if there had been WTC dust after the collapse, and she responded affirmatively, noting that the dust was gray. The inspection team did not consider this information. Further, an inspection team member examined the elevator shaft by running a finger through the dust, then rubbing his fingers together; on feeling no fibers, he stated that there was no WTC dust in the shaft. Martin received a letter from EPA declaring that her ventilation system and elevator shaft were cleared of WTC dust, and therefore would not be cleaned.

A contractor (Trio) came to clean the common spaces on March 27. Martin asked the supervisor if the workers should be wearing protective equipment. The supervisor

indicated that the workers had been advised of the risks, but he did not see any asbestos the cleaning areas.

Martin closed her comments by asking the members of the panel if they are satisfied that there is no WTC dust at 366 Broadway.

6.8 Robert Gulack

Robert Gulack is the Union Steward and Senior Attorney for the National Treasury Employees Union, Chapter 293, at the U.S. Securities and Exchange Commission (SEC). He spoke at this meeting as a Union Steward representing the bargaining unit at the SEC. Gulack opened his presentation by saying that the bargaining unit at the SEC has suffered for more than two years because of EPA's refusal to fufill its legal responsibility to test and decontaminate the office buildings affected by the WTC disaster. Gulack reviewed the symptoms and illnesses experienced by himself and those he represents.

Gulack presented his views on the actions of EPA in response to the WTC cleanup, noting the harm that has been inflicted on so many Americans by government officials through lack of testing and action to resolve these issues.

Gulack's complete written comments are contained in Appendix B to this report.

6.9 Anne Marie Principe

Anne Marie Principe lives in New Jersey and was an owner of a small business located in Lower Manhattan, several blocks from the WTC site. She returned to her business the day after the attacks and found that dust and smoke covered everything there. Each day, she resealed the windows and doors to try and prevent recontamination, but each day she reentered her business, there was more dust and smoke than before, and she became more and more ill. She was no longer able to breathe properly without inhalers, steroids, and nebulizers, often using her rescue inhaler up to three times a day. She had chest pains and would lose her voice every day by noon. She soon was unable to walk for distances and had recurring respiratory episodes culminating in emergency room visits to resume her normal breathing. By December 2002, she was on oxygen and medication. One morning she woke to find she could not stand, her joints were covered in a raised rash, and she could not breathe well enough to maintain conversation. The emergency room doctors did not know what to do, and they said they had seen similar symptoms from workers at the WTC site. The next day she visited her own doctor, who discovered that her right lung was not inflating and her left lung was functioning at 38 percent (with medications). The doctor could not help her. A doctor at Columbia thought surgery might help, but she was too ill to have the surgery. She eventually attended a program for fire and rescue workers, and she can now walk and breathe normally as a result of that program.

Principe expressed appreciation for the politics that must be involved in addressing the vast repercussions of such an unprecedented toxic event; however, she stated that it would be criminal to dismiss and leave untreated all of those people who were and will

become ill as a result of these events. Principe urged EPA to make it possible to clean up the buildings, because they are a source of continuing contamination. She asked the members of the panel to remember the people who live and work in these buildings. These people must be treated and tested.

6.10 Diane Lapson

Diane Lapson is the Vice President of the Independence Plaza Tenant Association. Independence Plaza was heavily impacted by the WTC collapse and many tenants were eyewitnesses. Lapson stated that the tenants of her buildings were told it was safe to stay in their buildings after the collapse and therefore did not evacuate the buildings. The Association now believes that recontamination probably occurred. EPA cleaned portions of the buildings, but they did not clean all of the common areas. The areas that were cleaned were cleaned after the residences. NYCDEP conducted a visual inspection of the rooftop, concluding there was no asbestos on the roof. Tenants discarded contaminated items using the compactor rooms, which were never cleaned by EPA but which have been shown by independent testing to be contaminated.

Lapson indicated that recontamination probably occurred from the following sources:

- Traffic into the compactor rooms
- Traffic from common area spaces into residences
- Barge activities producing dust
- Street cleaning activities using dry brushes
- Residents crossing the street.

One resident was told that her apartment had some level of asbestos, but the program ended and therefore her apartment was not cleaned again. Lapson mentioned other COPC that should be considered: lead, dioxin, and others that asbestos would not represent. Lapson closed her comments by asking that an independent scientific entity (like the National Academy of Sciences) oversee an aggressive testing, analysis, and cleanup program for all Lower Manhattan residents, whether or not they were previously tested.

6.11 Walter Jensen

Walter Jensen is a former employee of NYC Transit. Because of his exposure at Ground Zero, he has severe respiratory and other health problems: he stated that he will never be able to work again due to illness. Jensen indicated that workers were led to believe that the air was environmentally safe. Many workers were forced to work without personal protective equipment (PPE), in clear violation of OSHA regulations. Workers requested that OSHA conduct a survey of the site, but none was ever conducted. Workers who challenged the rules were subject to discipline or termination. Workers who brought their own personal protective equipment were told to remove it. NYC Transit brought in a private abatement firm that concluded that there was not even a trace of asbestos at the site, though it is common knowledge that there was.

Jensen stated that someone is lying and suggested that the closure of the stock exchange created worldwide economic chaos, and wondered if this caused people to endanger the residents and workers. Jensen asked where Christie Todd Whitman is and why she resigned. He suggested that she should be present at this meeting and explain the relationship of her statements about the WTC area to the White House Administration's decisions.

Jensen closed his comments by showing the members of the panel a newspaper headline from October 26 indicating that Ground Zero was a toxic zone. On October 25, he was rushed to the hospital with chest pain, and he could smell and taste the quality of the air and was not allowed to wear PPE. Jenson declared this is a national disgrace.

6.12 Kelly Colangelo

Kelly Colangelo is a resident at 41 River Terrace. She began noting that her comments have particular relevance to the meeting discussions on the participation rate for the sampling programs and testing HVAC systems.

Colangelo stated that after 9/11 there was a substantial turnover rate in Lower Manhattan. The 4,000 apartments that participated represent a small portion of residents who did not move out of the city—who stayed there because it is their home. Therefore, the sample population is a good sample. Further, she noted that the people who did participate in the program and the people who are commenting at these meetings are the people that care about this process.

Colangelo believes there needs to be an outreach effort to inform the newer residents of Lower Manhattan of the contamination and risks.

Colangelo noted inconsistencies in the cleanup activities that must be addressed in the resampling effort. In her own apartment, the cleaners did not follow protocol. She was told she could return to her apartment after the testing, but the project monitor did not conduct a post-cleaning inspection. She believes that a new testing program has to be very intensive in order to overcome the inadequacies of the prior program. Further, she stated she would not participate in a new program if there were not a detailed quality assurance plan.

Colangelo ended her comments by showing the members of the panel the filter from her HVAC from October 2001.

6.13 Paul Bartlett

Paul Bartlett is a Residential Associate of City University of New York, and his area of expertise is dispersion monitoring and measurement of trace contaminants.

Bartlett commented on the different types of contaminants that EPA and the members of the panel are considering. He expressed agreement for the consideration of contaminants

other than asbestos, since all of these contaminants are expected to disperse differently due to their different chemical properties and to what particulates they would attach.

Bartlett noted that contaminants resulting from fire have been somewhat neglected in these discussions, including other organics and fine particulates that would be produced by fires.

Most of the bulk sampling that was conducted was collected from settled dust outdoors. Outdoor settled dust does not contain the same proportion of fine particulate that is suspended in air and seeps inside buildings. Bartlett stated that the sampling program should have included numerous air filters from air pumps collecting those particulates and comprehensively analyzed.

EPA's COPC list was developed on the basis on inadequate analysis and characterization of suspended particulates, of which there is not much data.

Dioxin is included in the COPC, and has been found in very high amounts. Dioxin can be an indicator of other organics that may be present, including polybrominated diphenyl ethers (PBDEs). One panelist commented that volatiles and mercury are not of concern in residences; however, there are a lot of soft surfaces in apartments that may still contain these compounds. Mercury in fires forms mercury oxides, chlorides, and other halides that may still be present in soft surfaces.

Bartlett said that one of his primary concerns is these potential reservoirs for contaminants in apartments, including soft surfaces that need to be analyzed. Further, he is concerned that EPA dismissed analyzing PBDEs and their byproducts (including polybrominated biphenyl) in 2001 because there is not enough information about them: the European Union has conducted extensive studies on these compounds. There is still uncertainty about the toxicity of these compounds, but there is value in measuring them, as they are suspected endocrine disruptors and neurological impacts. Compounds of this class are distributed differently than other particulates and settle in higher floors of buildings.

6.14 Marjorie Clarke

Marjorie Clarke introduced herself and explained that she was supposed to speak at the last meeting, but could not because of the water emergency. Clarke's expertise is her understanding of the process by which materials are incinerated, the resulting pollutants, and pollution and emissions control. Clarke made contributions to the National Research Council's 2000 report on the health effects of waste incineration and served as the New York City Department of Sanitation's expert on incineration emissions control.

Clarke stated that the members of the panel also need to focus on the issues related to fire. There were two disasters from 9/11: the buildings' collapse and the fires. These two distinct events produced different pollutants and had different dispersion mechanisms, and need to be addressed separately. Asbestos came only from the collapses. Clarke

stated that it is wrong to assume that the dust that made its way inside buildings and ventilation systems resulted from the collapses.

Clarke reviewed data from uncontrolled incineration and burn barrels. Fly ash and particulate matter are produced from incomplete combustion of the waste source, which eventually falls out as contaminated dust. Fly ash is typically coated with incinerator pollutants such as mercury, other heavy metals, dioxin/furan, hydrochloric acid, sulfur dioxide, and other inorganics. It is likely that the combination of the two events—the collapses and the fires—created a synergy between the fine particulate matter, gypsum, fiberglass, and asbestos from the collapses, adding to the carbon particles normally occurring in a fire; these served as additional condensation nuclei for the mercury, dioxin, metals, and acids that volatilized in the heat of the fires and then condensed on the particles. As the coated fly ash drifted to cooler areas, it began to fall out.

Clarke mentioned that it is incorrect to assume that the dispersion pattern for asbestos is the same as for the other particles. She also reviewed two mechanisms of dioxin formation for the panel. She stated that she was startled to see that EPA's measurements of dioxins 12 days after the collapse were 50 to 60 percent above the standards for incinerators in Europe. This was at ground level, 12 days later.

She continued that backyard burning produces the same types of conditions as at the WTC, in that there are smoldering areas promoting the formation of dioxin and furans. Also, it has been noted that around barrels, these toxins accumulate at ground level. Therefore, these toxins are probably concentrated around the WTC site as well.

In conclusion, Clarke noted that an important thing to determine in these proceedings is if the question is simply whether the testing and cleaning experiment was successful in the limited area that was part of the prior program, or if the purpose is to identify the extent of any hazardous conditions that still exist across Manhattan, Brooklyn, and elsewhere so that a complete remediation can be conducted.

6.15 Marc Ameruso

Marc Ameruso is a Tribeca resident, a member of Community Board 1, and a volunteer rescue worker. Ameruso expressed agreement with Clarke's comments. He listed his concerns:

- Voluntary rescue workers were not informed of risks and were not given PPE.
- Obtain a list from the Red Cross of people they treated at Ground Zero who may not know they need treatment now.
- The health-based standards often are based on assumptions that PPE is available to workers, or take financial considerations into account. Ameruso suggests the panelists rethink these standards, which may have been set 20 years ago.
- Find out what the synergistic effects of the chemicals. (Bartlett and Clarke also mentioned this.) Develop standards on the synergistic effects of chemicals.

- This panel should meet and keep meeting as long as necessary to ensure that the dots can be connected 20 years from now, when some of the long-term effects are being experienced.

6.16 Uday Singh

Uday Singh presented mercury data gathered from March 2002 through February 2003. Some of these data contradict some of the assumptions made here. Bulk samples collected in March and April 2002 had mercury concentrations identical to those in samples collected in February 2003. Some studies performed with a lumex sample analyzer in June and July 2003 indicate a normalization of outdoor concentrations—that is, from as high as 80 nanograms to less than 10 nanograms for ambient samples, and consistently high concentrations indoors, sometimes as high as 200+ nanograms. These samples were far higher in areas with restricted air movement.

Singh noted that the biological studies that have been conducted used serum samples, and he suggested that urine samples should also be analyzed. Additionally, Singh collected data with a mercury analyzer in March 2003 that indicates excessive concentrations.

Singh posed this question: If, sampling 7 and 8 months after the events, he was still able to detect mercury vapor both in ambient and indoor environments, what were these levels originally in September, October, and November 2001? What were the mercury particulate concentrations? Would they have acute or chronic effects?

Singh said he would forward EPA a copy of his results.

6.17 Mary Perillo

Mary Perillo opened her comments by saying she believes that the members of the panel are moving in a positive direction. Perillo lives in the closest residential building to the WTC. She read a prepared statement from residents in her building.

This statement summarized the experience of the residents of 125 Cedar Street and the building conditions after 9/11. The residents providing the statement support a program of recleaning and retesting downtown residences and offices, a program that is not limited to testing and cleaning for asbestos.

Her written statement is contained in Appendix B.

After reading the prepared statement, Perillo addressed the members of the panel, noting that while she recognized some of the faces, some of the members of the panel were new. She stated that the level of exposure that she and others experienced was beyond what anyone can imagine. She read her own statement indicating her personal experience after 9/11.

Windows in Perillo's building had blown in, and the building had up to 4 feet of debris in some places. The debris contained window flashing, computer keyboards, desk bits, carpeting, and dust from the WTC. The residents repeatedly requested indoor air testing from federal, government, and local agencies to test the indoor air, but had no response. They did not receive any guidance about PPE until Perillo casually talked to an OSHA employee who told her about P100 respirators.

Perillo's landlord indicated he would have the building cleaned if the residents cleared everything out, including the debris and appliances. The EPA-funded cleanup program began in September 2002, lasting 2 months. Perillo wondered now what the residents have been exposed to since the cleaning, and what exposures they will experience with the demolition of Deutsche Bank. Perillo believes retesting is necessary and recleaning may be required.

6.18 Maureen Silverman

Maureen Silverman is the Executive Director of the New York City Coalition to End Lead Poisoning (NYCCELP) and a resident of Independence Plaza. Silverman described the purpose and history of NYCCLEP, and reviewed New York City legislation to address and monitor lead poisoning in children.

Silverman emphatically expressed concern for the lead exposures that children may have previously or currently experienced as a result of WTC contamination. She provided a history of NYCCELP's attendance and a request for assistance at public hearings and meetings on the WTC contamination. Silverman stated that EPA indicated that its limited sampling showed that lead did not pose a risk to the public. However, Silverman's understanding of EPA's own data indicate that lead is significant, exceeded EPA's benchmarks in 31.5% of residents EPA tested, and was the most commonly encountered contaminant in EPA's limited and unrepresentative sample.

Silverman asked for an explanation: Why are lead biomarkers being measured in adult firefighters when pregnant woman and children are the most at risk? Silverman further offered data on the other sources of lead contamination in NYC.

Silverman expressed concern that EPA was unable to distinguish background lead samples from WTC lead in newer buildings that shouldn't have lead background levels. She reviewed data (from the U.S. Department of Housing and Urban Development) on the presence of lead-based paint and the presence of lead in soils.

Children and pregnant women in the area affected by the WTC need to be screened for lead exposure. Silverman said that if lead is found, EPA should test in the apartments as well. EPA needs to make referrals with landlords and have them abate and clean their buildings.

6.19 Joan Greenbaum

Joan Greenbaum presented comments on behalf of union members and people who work and are educated in the Borough of Manhattan Community College (BMCC). Greenbaum and Dr. Kotelchuck are co-chairs of the Professional Staff Congress (PSC), which is the union for 16,000 City University of New York (CUNY) workers. BMCC has over 20,000 students. Greenbaum clarified that she was speaking as a health and safety activist, and is not an expert on these topics.

BMCC was evacuated effectively on 9/11. Fiterman Hall had sustained significant damage and remains very badly damaged. As a result, the main building is very overcrowded now, with over 20,000 students present on a daily basis. Despite the continuing efforts of the union, BMCC, and CUNY, cleanup and health problems remain in the building, stemming from financial issues and the lack of clarity of cleanup protocols.

Greenbaum explained that PSC was part of a study conducted by NIOSH. Greenbaum briefly reviewed the findings of that study, including that 30% of members experienced nose, throat, and eye irritation and 28% had ongoing coughs and headaches, 7 months after 9/11. EPA should coordinate with NIOSH on evaluating the results of that study for EPA's efforts.

Greenbaum made further statements on the buildings. In late June/early July 2002, an environmental firm found elevated lead concentrations in the air ducts in the BMCC building; however, the building classrooms were cleared for asbestos 2 months after 9/11. (The theaters and gymnasiums, which were used for the rescue workers, were not cleared.)

The union has argued for the ductwork to be cleaned from the day after 9/11; this cleaning was not done until April 2003. The BMCC administration argued that they did not have the funds to do the work, and the BMCC administration said that immediate action was not necessary because EPA said there were no lead levels of concern in air ducts. Greenbaum reported the test results for lead in the ducts, which exceeded EPA guidelines for residences.

Greenbaum presented some possible sources of lead, including the collapses and trucks delivering debris to the barge-loading site.

In closing, Greenbaum stated that EPA should (for workplaces as well as residences):

- Test for workplace interiors and residences.
- Study synergistic effects.
- Enlist professional cleaning crews.
- Conduct ongoing monitoring for indoor air quality and outside air and water quality.

6.20 Ariel Goodman

Ariel Goodman is the president of From The Ground Up, which represents over 650 small businesses that were located in and around the WTC site. Goodman's business was located in One WTC on the 87th floor. She is also a resident of Battery Park City and Gateway Plaza, and in addition was a rescue worker at the WTC.

Goodman distributed pictures of the inside of her apartment. EPA cleaned it in May 2003. They did not clean her kitchen or bathroom, or open up any of the closets. Only 8 hours were spent cleaning her apartment; the air ducts were not cleaned or taped over, and Goodman did not receive a report on what was done in her apartment.

Goodman commented that EPA's report that the air and the dust were okay caused substantial problems for insurance for small businesses. She read from three testimonies of small business that had been right next to the WTC or two blocks away.

- One small business owner, located on Liberty Street, asked EPA to clean his store. EPA agreed to clean one section of the store; EPA did not clean the air conditioning units and left debris in the ceiling, in the tiles, and clogged in the stairways. The small business then went to insurance to ask for coverage in cleaning. Insurance did not cover the complete amount, and he had to pay $700 to complete the cleaning.
- Another example is a restaurant located two blocks away, in which the sewer lines broke and all of the windows were broken. The restaurant did not have water for 7 months, so cleanup was difficult. The insurance company agreed to give them $10,000 to clean the entire restaurant, which serves 300 people. The restaurant had to pay $18,000 for dust removal and $90,000 to replace the kitchen equipment. This restaurant is still in discussions with the insurance company over the replacement of the kitchen equipment, because the insurance company is citing the EPA report that everything was okay.

Goodman closed her comments by making the following recommendations:

- Cleanup needs to include residences, large businesses, and small businesses.
- Reeducate the new population that has moved in.

6.21 Ilona Kloupte

Ilona Kloupte is a resident of Battery Park City. Kloupte hired Airtech Environmental to evaluate the contamination levels in her apartment after EPA's most stringent, Scope B cleanup in her apartment. She noted that her building was constructed in 1989, and therefore should not have background lead levels.

Kloupte presented the results of sampling conducted after EPA's cleanup in her apartment:

- Bathroom metal vent: 535.1 μg/m^2 (detection limit was 51.8).
- Cadmium, chromium, lead, and zinc, present above EPA clearance values.
- Particles including fiberglass: 30 percent fiberglass contained in the dust.

Lead is in the building's HVAC system. There are 27 children in this building. Kloupte received fiberglass poisoning as a result of the contamination in her apartment. She continues to have WTC symptoms, and steroids and antibiotics do not provide relief. She ended her comments stating that she had 10 to 15 years taken off of her life as a result of this contamination, and asked the members of the panel to consider her and the other victims.

7. CLOSING REMARKS

Gilman thanked the commenters and the members of the panel, and adjourned the meeting.